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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,250	06/15/2005	Robertus Theodorus Franciscus Van Schaijk	BE02 0042 US	2435

24738 7590 10/12/2006

PHILIPS ELECTRONICS NORTH AMERICA CORPORATION  
INTELLECTUAL PROPERTY & STANDARDS  
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SAN JOSE, CA 95131

EXAMINER

GOODWIN, DAVID J

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 10/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

*JS*

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/539,250	VAN SCHAIJK ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	David Goodwin	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 June 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☒ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/15/05</u>                                                   | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

The abstract of the disclosure does not commence on a separate sheet in accordance with 37 CFR 1.52(b)(4). A new abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text.

#### ***Claim Objections***

#### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 5 through 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1. Claims 5, 10, and 11 recite the limitation forming isolation slits by a silicon dioxide in said trench."
2. Claims 6-9 and 12-14 are rejected as incorporating the limitation by reference.
3. This statement is unclear. It is suggested that the applicant intended that slits are filled with silicon oxide or possibly that the slits are formed in a silicon oxide layer
4. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4, 15, 16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin (US 6,093,606).
3. Regarding claim 1
4. Lin teaches a semiconductor device comprising a vertical split gate non-volatile memory cell on a substrate (10). Said device comprises a trench (18), with a first active region (24) and a second active region (24) and a channel region extending substantially along a side wall of said trench (18) (fig 2I) (column 3 lines 30-60). Said trench has length in a first direction and a width in a second direction said first direction being perpendicular to said second direction (fig 6). Said trench is covered on said sidewalls by a tunnel oxide (22) and comprising a gate stack (fig 2I) (column 4 lines 30-55). Said gate stack consisting of a floating gate (fg) and a control gate (cg). Said floating gate being separated from said control gate by a dielectric (30) characterized in that said control gate extends to the bottom part of the trench (2I). A first floating gate is located at a left side wall of said trench to form a first gate stack and a second floating gate is located at a right side wall of said trench to form a second gate stack with said control gate (fig 2I) (column 4 lines 40-65).
5. Regarding claim 2.
6. The dielectric extends along an upper exposed part of said sidewall of said trench. Said control gate extends along said dielectric covering said upper exposed part of said sidewall of said trench (fig 2L).
7. Regarding claim 4.

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8. The first floating gate and second floating gate are isolated from each other (column 4 lines 60-65).

9. Regarding claim 15.

10. Lin teaches an array of memory cells (fig 3).

11. Regarding claim 16.

12. Lin teaches an array of memory cells (fig 3).

13. Regarding claim 18.

14. Lin teaches an array of memory cells (fig 3).

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claim 3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US 6,093,606) as applied to claim 1 above, and further in view of Mukherjee (US 5,751,038).

17. Lin teaches elements of the claimed invention above.

18. Lin does not teach that the split gates are connected.

19. Mukherjee teaches a memory device. Said device comprises forming a floating gate in a trench (column 4 lines 25-55). Said floating gate comprises a first floating gate on a first sidewall a second floating gate on a second sidewall, said floating gates are connected by an interconnecting portion of polysilicon (fig 3).

20. It would have been obvious to one of ordinary interconnect the floating gates in order to increase the surface area of the floating gate available for applying a charge.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Goodwin whose telephone number is (571)272-8451. The examiner can normally be reached on Monday through Friday, 9:00am through 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571)272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJG

*Andrew M. Smith*  
Primary Examiner